

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 08-300252A

(43)Date of publication of application : 19.11.1996

(51)Int.Cl.

B24B 37/00

B24B 1/00

B24B 37/04

B24B 57/02

H01L 21/304

(21)Application number : 07-127391

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(22)Date of filing : 28.04.1995

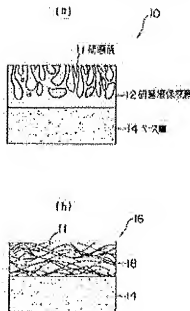
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(54) ABRASIVE CLOTH AND GRINDING MACHINE

(57)Abstract:

PURPOSE: To provide abrasive cloth and a grinding machine suited to this abrasive cloth, capable of feeding abrasive surface with grinding fluid uniformly with a required quantity neither more nor less.

CONSTITUTION: This abrasive cloth 10 consists of a polyurethane foam grinding fluid content layer 12 of 0.5mm to 3mm in thickness, with an abrasive surface on an upper surface, and a grinding fluid permeative base layer 14 of 4mm in thickness. This base layer 14 is composed of a grinding fluid permeative material in order to feed the grinding fluid content layer 12 with the grinding fluid after being permeated from a lower part of the base layer 14, for example, foaming material such as polyurethane foam or polystyrene or the like or nonwoven fabric material. This grinding fluid permeativeness means a property of permeating the grinding fluid, and grinding grain size to be contained in the grinding fluid is a range from about 0.01 μ m to several μ m, so that this grinding fluid permeativeness in the base layer 14 must be grinding permeative properties to pass through this size of grinding grain size.



Detailed Description of the Invention:

[0021]

Second Embodiment of Polishing Cloth

Figures 2 are cross sectional views each illustrating a structure of the second embodiment of the polishing cloth according to the present invention. Figure 2(a) illustrates an example in which the polishing liquid retaining layer is formed of a foamed material, and Figure 2(b) illustrates an example in which the polishing liquid retaining layer is formed of a nonwoven material. A polishing cloth 20 according to the present embodiment illustrated in Figure 2(a) has the same structure as that of the polishing cloth 10 according to the first embodiment, except that a base layer 22 having a different structure is provided instead of the base layer 14 of each of the polishing cloths 10 and 16 according to the first embodiment.

[0022]

As illustrated in Figure 2(a), the base layer 22 of the present embodiment is provided with polishing liquid supply holes 24 in a thickness direction of the base layer 22 from a lower surface of the base layer 22 to the polishing liquid retaining layer 12, in order to supply the polishing liquid from a lower side of the base layer 22 to the polishing liquid retaining layer 12. A hole diameter of each polishing liquid supply hole 24 needs to be small enough not to impair the flatness of the polishing cloth 20 and the uniformity of a compression rate and large enough to prevent the occurrence of clogging with polishing abrasive grains contained in the used polishing liquid. Accurately speaking, the hole diameter of the polishing liquid supply hole 24 differs depending on the used polishing abrasive grains, but normally may be approximately 1 μm to 1 mm in consideration of the fact that the size of the polishing abrasive grains contained in the polishing liquid is normally 0.01 μm to several μm . In addition, it is possible to adopt: entire surface equal arrangement in which the polishing liquid supply holes 24 are arranged to be equally distributed on an entire surface of the base layer 22; or local arrangement, for example, the arrangement in which the polishing liquid supply holes 24 are linearly arranged on a center line of a track along which the wafer to be polished passes by the rotation of a rotating table described later of the polishing apparatus.

[0023]

A polishing cloth 26 illustrated in Figure 2(b) is a modified example of the polishing cloth 20, and has the same structure as that of the polishing cloth 20 illustrated in Figure 2(a), except that the polishing liquid retaining layer 18 is formed of a polyester nonwoven material instead of a foamed material.

[0024]

Third Embodiment of Polishing Cloth

Figures 3 are cross sectional views each illustrating a structure of the third embodiment of the polishing cloth according to the present invention. Figure 3(a) illustrates an example in which the polishing liquid retaining layer is formed of a foamed material, and Figure 3(b) illustrates an example in which the polishing liquid retaining layer is formed of a nonwoven material. A

polishing cloth 30 according to the present embodiment illustrated in Figure 3(a) has the same structure as that of the polishing cloth 10 according to the first embodiment, except that a base layer 32 having a different structure is provided instead of the base layer 14 of each of the polishing clothes 10 and 16 according to the first embodiment.

[0025]

The base layer 32 of the polishing cloth 30 according to the present embodiment is provided with a polishing liquid path formed of a polishing liquid supply horizontal hole 34 and polishing liquid supply vertical holes 36. The polishing liquid supply horizontal hole 34 extends from a side surface of the base layer 32 substantially in parallel with a bottom surface thereof, and the polishing liquid supply vertical holes 36 are each branched from the polishing liquid supply horizontal hole 34 to extend to the polishing liquid retaining layer 12 in a vertical direction, for guiding the polishing liquid from the polishing liquid supply horizontal hole 34 to the polishing liquid retaining layer 12. Accurately speaking, a hole diameter of each of the polishing liquid supply horizontal hole 34 and the polishing liquid supply vertical holes 36 differs depending on polishing abrasive grains contained in the used polishing liquid, but is approximately 1 μm to 1 mm in consideration of the fact that the size of the polishing abrasive grains contained in the polishing liquid is normally 0.01 μm to several μm . It should be noted that, in the case where the base layer 32 is formed of a polishing liquid permeable material, for example, a nonwoven material, the polishing liquid may be supplied from the horizontal hole 34 to the polishing liquid retaining layer 12 due to the polishing liquid permeability of the base layer, without providing the polishing liquid supply vertical holes 36. In addition, the horizontal hole 34 may be formed by burying a pipe or the like having a pipe wall on which a large number of holes are formed.

[0026]

A polishing cloth 38 illustrated in Figure 3(b) is a modified example of the polishing cloth 30, and has the same structure as that of the polishing cloth 30 illustrated in Figure 3(a), except that the polishing liquid retaining layer 18 is formed of a polyester nonwoven material instead of a foamed material.